IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPELLANT:	Janneteau et al.	EXAMINER:	Lai, Andrew
SERIAL NO.:	10/518,140	GROUP:	2616
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TITLED: Data Flow Between A Communication Node And A Mobile Node In A Mobile Network

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APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner of Patents
P.O. Box 1450
Alexandria, Va. 22313-1450

Commissioner:

The appellants hereby respectfully submit the following Appeal Brief in response to an Advisory Action of March 27, 2008 and a Final Office Action dated May 5, 2008, with a Notice of Appeal filed herewith.

1. REAL PARTY IN INTEREST

The real party in interest in this appeal is Motorola, Inc., a Delaware corporation having a primary place of business in Schaumburg, Illinois.

2. RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in this appeal.

3. STATUS OF CLAIMS

This is an appeal from a Final Office Action, dated May 5, 2008. Claims 1-12 and 27-33 are pending and presently stand one time and finally rejected and constitute the subject matter of this appeal. Claims 1-12 and 27-33 are appealed.

In a First Office Action dated December 14, 2008, the Examiner rejected Claims 1-6, 10-12 and 27 under 35 U.S.C. §103(a) as being unpatentable over Williams et al (US 5883891, hereinafter "Williams") in view of Ernst ("Network Mobility Support in IPv6", a PhD thesis to the Dept. of Mathematics and Computer Science at the Universite Joseph Fourier, France, October 29, 2001, hereinafter "Ernst"), rejected claim 7 under 35 U.S.C. §103(a) as being unpatentable over Williams in view of Ernst, as applied to claim 5, and further in view of Inoue (US 6,587,882), and rejected claims 8 and 9 under 35 U.S.C. §103(a) as being unpatentable over Williams in view of Ernst, as applied to claim 5, and further in view of Baba et al (US 6,799,204). In an amendment and response dated February 12, 2008, the appellants replied to the first Office Action with an amendment to claims 1, 4-9, 13, 15-18, 20-25 and 27-40.

In a Final Office Action dated May 5, 2008, the Examiner rejected claim 27 under 35 U.S.C. §112, second paragraph, rejected Claims 1-6, 10-12, 27, 29 and 33 under 35 U.S.C. §103(a) as being unpatentable over Williams et al (US 5883891, hereinafter "Williams") in view of Ernst ("Network Mobility Support in IPv6", a PhD thesis to the Dept. of Mathematics and Computer Science at the Universite Joseph Fourier, France, October 29, 2001, hereinafter "Ernst"), rejected claim 7 under 35 U.S.C. §103(a) as being unpatentable over Williams in view of Ernst, as applied to claim 5, and further in view of

Inoue (US 6,587,882), rejected claims 8 and 9 under 35 U.S.C. §103(a) as being unpatentable over Williams in view of Ernst, as applied to claim 5, and further in view of Baba et al (US 6,799,204), rejected claim 28 under 35 U.S.C. §103(a) as being unpatentable over Williams in view of Ernst, and further in view of Jinzaki (US 2001/0042070), rejected claim 30 under 35 U.S.C. §103(a) as being unpatentable over Williams in view of Ernst, as applied to claim 1, and further in view of Kajiwara (US 2002/0015386), and rejected claims 31 and 32 under 35 U.S.C. §103(a) as being unpatentable over Williams in view of Ernst, as applied to claim 1, and further in view of Callon et al (US 5,854,899). In an amendment after final rejection and response dated May 5, 2008, the appellants replied to the Final Office Action with an amendment to claim 27.

The clean copy of the pending claims 1-12 and 27-33 filed and entered after the Final Office Action and Advisory Action are reproduced below.

4. STATUS OF AMENDMENTS

A Response to the Final Office Action was filed on May 5, 2008, and is currently pending. In the Response to the Final Office Action, the appellants responded to the Examiner's rejection of claims 1-12 and 27-33. In an Advisory Action, the Examiner upheld the Final Rejection, and did not enter the amendment after the Final Office Action, with the exception of corrections to claim 27 for §112 2nd indefinite issues.

5. SUMMARY OF CLAIMED SUBJECT MATTER

The present invention is concerned with optimizing the routing path (number of hops) towards intermediate nodes located behind (one or more) mobile routers. In particular, the route message (containing a care-of route) can be sent from second node to the first node without any request from the first node, which reduces messaging overhead and increases efficiency. Further, the first node can then compute a preferred path; possibly leading to the removal of some addresses of the care-of route received from the second node.

Specifically, Claim 1 provides a method of transmitting a data packet on a communication path from a first communication node to a second communication node in a mobile network, where the second communication node is connected to the data network through at least one intermediary mobile router (see page 22 line 1 to page 23 line 9 of the text). The method includes a first aspect of the second communication node determining a care-of route including a list of addresses of the at least one intermediary mobile router between said data network and said second communication node (support for which can be found on page 30 lines 12-14, describing Fig. 10). The method includes a second aspect of the second communication node sending a route message to the first communication node without any explicit request for said route message being received by the said second communication node from the first communication node, wherein said route message includes the care-of route (support for which can be found on page 22 lines 29-32, page 32 lines 8-24, and page 33 lines 1-11 (describing Fig. 13) which describes the periodic (thus without explicit request) sending of route message (extended binding update) from a second node (in a mobile network) to a first node (its correspondent node – CN)). The method includes a third aspect of the first communication node generating a preferred communication path in response to said care-of route received from said second communication node (support for which can be found on page 48 lines 6-9 and 19-25 and page 49 lines 15-18). The method includes a fourth aspect of the first communication node transmitting said at least one data packet from said first communication node to said second communication node via said preferred communication path (support for which can be found on page 44 lines 1-4).

Claim 27 includes all the recitations of claim 1, in apparatus form. Specifically, claim 27 describes a data network including a first communication node for transmitting a data packet on a communication path from a first communication node to a second communication node, where the second communication node is in a mobile network connected to the data network through at least one intermediary mobile router (see page 22 line 1 to page 23 line 9 of the text). The data network includes a second communication node that determines a care-of route including a list of addresses of the at least one intermediary mobile router between said data network and said second communication node (support for which can be found on page 30 lines 12-14, describing

Fig. 10), and sends a route message to a first communication node without any explicit request for said route message being received from the first communication node, wherein said route message includes the care-of route(support for which can be found on page 22 lines 29-32, page 32 lines 8-24, and page 33 lines 1-11 (describing Fig. 13) which describes the periodic (thus without explicit request) sending of route message (extended binding update) from a second node (in a mobile network) to a first node (its correspondent node – CN)). The data network also includes a first communication node that generates a preferred communication path in response to said care-of route received from said second communication node(support for which can be found on page 48 lines 6-9 and 19-25 and page 49 lines 15-18), and transmits said at least one data packet to said second communication node via said preferred communication path (support for which can be found on page 44 lines 1-4).

Claim 28 includes all the recitations of claim 1 with the further limitations of use of an extended binding cache for a data packet. Specifically, claim 28 provides a method for building an extended binding cache for a data packet on a communication path from a first communication node to a second communication node in a mobile network, where the second communication node is connected to the data network through at least one intermediary mobile router (see page 45 lines 7-13, and page 22 line 1 to page 23 line 9 of the text). The method includes a first aspect of determining, by the second communication node, a care-of route including a list of addresses of the at least one intermediary mobile router between said data network and said second communication node (support for which can be found on page 30 lines 12-14, describing Fig. 10). The method includes a second aspect of sending, by the second communication node, an extended binding update message to the first communication node without any explicit request for said update message being received by the said second communication node from the first communication node, wherein said update message includes the care-of route for messages to reach said second communication node (support for which can be found on page 45 lines 7-13, page 22 lines 29-32, page 32 lines 8-24, and page 33 lines 1-11 (describing Fig. 13) which describes the periodic (thus without explicit request) sending of route message (extended binding update) from a second node (in a mobile network) to a first node (its correspondent node – CN)). The method includes a third

aspect of receiving, from the second communication node, the extended binding update message indicating the intermediary addresses in the route for messages to reach said second communication node. The method includes a fourth aspect of comparing said intermediary addresses of said extended binding update message with intermediary addresses, if any, of the first communication node's care-of route (support for which can be found on page 48 lines 19-25). The method includes a fifth aspect of extracting at least one subsequent route of said second communication node, when said comparison fails to yield a match following previous route matches, thereby generating an extended binding cache entry indicating a preferred route to said second communication node (support for which can be found on page 49 lines 10-18). The method includes a sixth aspect of transmitting said data packet from said first communication node to said second communication node via said preferred route (support for which can be found on page 44 lines 1-4).

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-6, 10-12, 27, 29 and 33 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Williams et al (US 5883891, hereinafter "Williams") in view of Ernst ("Network Mobility Support in IPv6", a PhD thesis to the Dept. of Mathematics and Computer Science at the Universite Joseph Fourier, France, October 29, 2001), hereinafter "Ernst".

Claim 7 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Williams in view of Ernst, as applied to claim 5 above, and further in view of Inoue (US 6,587,882).

Claims 8 and 9 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Williams in view of Ernst, as applied to claim 5 above, and further in view of Baba et al (US 6,799,204).

Claim 28 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Williams in view of Ernst, and further in view of Jinzaki (US 2001/0042070).

Claim 30 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Williams in view of Ernst, as applied to claim 1 above, and further in view of Kajiwara (US 2002/0015386).

Claims 31 and 32 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Williams in view of Ernst, as applied to claim 1 above, and further in view of Callon et al (US 5,854,899).

The appellant disputes these rejections.

7. ARGUMENT

(i) Rejection under 35 U.S.C. §112, first paragraph:

None

(ii) Rejection under 35 U.S.C. §112, second paragraph:

None

(iii) Rejection under 35 U.S.C. §102:

None

(iv) Rejection under 35 U.S.C. §103:

A. Rejection under 35 U.S.C. 103(a) – Williams in view of Ernst

The Examiner rejected Claims 1-6, 10-12, 27, 29 and 33 under 35 U.S.C. §103(a) as being unpatentable over Williams et al (US 5883891, hereinafter "Williams") in view of Ernst ("Network Mobility Support in IPv6", a PhD thesis to the Dept. of Mathematics and Computer Science at the Universite Joseph Fourier, France, October 29, 2001), hereinafter "Ernst".

Preamble of claim 1

The Examiner states that Williams teaches a method of transmitting a data packet ("permit computer users to talk to each other using voice communication, and their computers, over the Internet"), col. 1 lines 13-15, wherein "the digital data is organized into a bitstream consisting of packets", col. 1 lines 21 -22) on a communication path ("over various types of communication channels", col. 1 lines 17-1 8, and also fig. 1B, e.g., "route A") from a first communication node ("source node", col. 2 line 54, or fig. 1B "host 15") to a second communication node ("destination node", col. 2 lines 55-56, or fig. 1B "host 20") in a network (fig. 1A "internet 10"), wherein the second communication node (fig. 1B "host 20") is connected to the data network through at least one intermediary router (it is obvious to one skilled in the art, referring to fig. 1B, that said "host 20" has to be connected to the data network, "internet 10", through intermediary routers because it is communicating with "host 15" via various "route A, B, C, D, E" etc. as depicted in fig. 1B). Appellant is willing to submit that Williams describes two communication nodes communicating through an intermediate router. However, the Examiner admits that Williams does not describe an intermediate router for mobile devices, but that Ernst does so describe. Appellant is willing to submit that the cited art can be interpreted to infer two communication nodes communicating through an intermediate mobile router. However, the particular way that mobile routing is performed is not described by the cited art, as will be described below.

First element of claim 1

With respect to the first element of claim 1, the Examiner stated that Williams discloses the second communication node (fig. 1B "host 20") determining a care-of route ("echo route packet", col. 4 line 24, and "unique routes could be derived from routes obtained by using echo route packets", col. 8 lines 53-54) including a list of addresses of the at least one intermediary router between said data network and said second communication node ("when the echo route packet is received by the destination node, it is transmitted back to the source node", col. 8 lines 10-1 1, and see in fig. 5, which "illustrates an echo route packet which has traveled through a route and has recorded its intermediate node addresses and times", col. 4 lines 24-26, noting that said "intermediate node" comprises "routers" as recited col. 8 lines 17-18, "'strict source routing' in which

the header lists all intermediate nodes (routers)", and see further that said echo route packet "include a list of nodes in sequence, that best determines the route over which the packet is transmitted", col. 8 lines 66-67).

Appellant is willing to submit that the art can be interpreted to infer a communication node determining a care-of route including a list of addresses of the at least one intermediary mobile router between said data network and said communication node.

Second element of claim 1

In accordance with the second element of claim 1, a second communication node sends a route message (care-of addresses) to the first communication node without any explicit request for said route message being received from the first node. Support for this can be found on page 22 lines 29-32, page 32 lines 8-25, and page 33 lines 1-11 (describing Fig. 13) which describes the periodic (thus without explicit request) sending of route message (extended binding update) from a second node (in a mobile network) to a first node (its correspondent node – CN). Appellants respectfully submit that the cited art is missing this novel aspect of a communication node sending a route message without a request to do so, and provides no teaching or motivation to do so since the cited art solely teaches explicit requests for routing.

The Examiner refers to a passage in Williams for ("the echo route packet is sent by the source node to the destination node (destination host server) to collect the node IDS along its route", col. 7 line 66 - col. 8 line 1, noting said "echo route packet" being received by the "destination node" from the "source node" without any explicit request by the "destination node" because it is the "source node" that proactively initiates the "echo route packet"), wherein said route message ("echo route packet") includes the care-of route (again see fig. 5).

Appellants respectfully disagree that Williams discloses or suggests the feature "without any explicit request". In the Examiner's cite of col. 7 line 66 to col. 8 line 1, there is no mention that the echo route packet is sent without a request (see details of the "echo route" packet at the top of col. 8). Nor does the Examiner's cite of Fig. 5 lend any further support therefor. Instead, Williams echo route packet service is performed only in

response to a specific communication, which implies a request, unlike appellant's invention that uses periodic messaging, without regards to a specific request, if any.

From a technical standpoint it is clear that Williams and appellants' invention address two different problems, and that the details of the proposed solutions are also different. Williams looks into improving quality of VoIP communications by using data redundancy and packet replication and delivery along multiple paths (to better accommodate potential packet loss). Whereas, appellants' invention optimizes the routing path (number of hops) towards nodes located behind (one or more) mobile routers. Williams uses the "echo route" packet to build the intermediate address path from the source node to the destination node. However, Williams does not suggest or disclose intermediates nodes in the path being mobile routers and therefore could not envision mobile addressing.

In Williams, the "echo route" packet (used to compute the list of intermediate addresses) is sent by the first node to the second node (i.e. a request message…which is dynamically populated with intermediate addresses as it is routed towards the second node). The list of intermediate addresses (forming the path) is only sent by the second node (destination node) to the first node (source node) *in response to a request* from the first node to the second node (see details of the "echo route" packet at the top of col. 8). This is clearly different from appellants' invention, where the route message (containing the care-of route) is sent periodically (i.e. without any request) from the second node to the first node.

Third element of claim 1

In accordance with the third element of claim 1, the first communication node generating a preferred communication path in response to said care-of route received from said second communication node. Appellants respectfully submit that the cited art is missing this novel aspect of a communication node sending a route message without a request to do so, and provides no teaching or motivation to do so since the cited art solely teaches explicit requests for routing.

The Examiner refers to a passage in Williams for the first communication node ("source node") generating a preferred communication path ("select the best available

route", col. 3 line 17) in response to said care-of route ("echo route packet") received from said second communication node ("When the source node receives the echo route packet, it extracts the route", col. 8 lines 13-1 4, and "The source node compares a number of returned echo packets which have been transmitted over different routes, to select the best available route", col. 3 line 14-17).

Appellants respectfully disagree that Williams discloses or suggests the feature of the first communication node generating a preferred communication path in response to said care-of route received from said second communication node. In particular, William's echo route packet received from by first node *was generated by the first node* and only echoed off the second node. In contrast, appellants' care-of route is generated in the second node without any communication from the first node, which is completely different, not to mention using only half of the messaging overhead.

Fourth element of claim 1

Regarding the fourth element of claim 1, appellant is willing to submit that it is known for a first communication device to send a packet to a second communication device via a preferred communication path.

Regarding arguments over the further cited art, Ernst, this art discloses mobile network routing which relies on the standard path reversal techniques where the first node receives addresses from a second node and just needs to reverse the list of addresses received to compute the path. Whereas, the path computation algorithm of the appellants' invention is different in the sense that; a) the list of addresses in the "route message" (i.e. binding update) sent to the first node does not need to be reversed; and b) all the information to compute the path from first to second node is not included in the received "route message", instead some additional information local to the first node is needed.

Moreover, Ernst has the same failing as Williams in that Ernst fails to suggest or disclose the second communication node sending a route message (care-of address) to the first communication node without any explicit request for said route message being received. Nor does Ernst provide a technique to optimize the routing path towards nodes

located behind (one or more) mobile routers. Accordingly, Ernst is missing the same several elements as distinguished for Williams above.

In summary, appellant submits that the cited art is completely missing the elements of; a) a second communication node generating a route message for a first communication node without an request to do so, and b) a route message being sent only from a second communication node to a first communication node without a route message being sent from the first communication node.

Therefore, appellants respectfully submit that claim 1 is patentably distinct and non-obvious from the cited art, and is therefore deemed allowable.

Claims 2-6, 10-12, 29 and 30

Appellant respectfully submits that claims 2-4, 10-12, 29 and 30 are dependent on claim 1, respectively, hereby incorporated by reference, and are therefore deemed allowable as well in view of this dependency.

Claim 27

Independent claim 27 includes the same recitations as detailed with respect to claim 1 above, in apparatus form. The appellant therefore respectfully submits that all of the points raised above with respect to the claim 1 are relevant for claim 27 as well. Those points will not be repeated here, however, for the sake of brevity, but to say that claim 27 is deemed allowable as well for the same reasons.

As a result, the appellant respectfully submits that claims 1-6, 10-12, 27, 29 and 30 are allowable over the references of record and respectfully requests a corresponding ruling.

B. Rejection under 35 U.S.C. 103(a) – Williams, Ernst, in view of Inoue

The Examiner rejected claim 7 under 35 U.S.C. §103(a) as being unpatentable over Williams in view of Ernst, as applied to claim 5 above, and further in view of Inoue (US 6,587,882).

Appellant respectfully submits that claim 7 is dependent on claim 1, previously distinguished and hereby incorporated by reference, and is therefore deemed allowable as well in view of this dependency.

C. Rejection under 35 U.S.C. 103(a) – Williams, Ernst, in view of Baba

The Examiner rejected claims 8 and 9 under 35 U.S.C. §103(a) as being unpatentable over Williams in view of Ernst, as applied to claim 5 above, and further in view of Baba et al (US 6,799,204).

Appellant respectfully submits that claims 8 and 9 are dependent on claim 1, previously distinguished and hereby incorporated by reference, and are therefore deemed allowable as well in view of this dependency.

D. Rejection under 35 U.S.C. 103(a) – Williams, Ernst, in view of Jinzaki

The Examiner rejected claim 28 under 35 U.S.C. §103(a) as being unpatentable over Williams in view of Ernst, and further in view of Jinzaki (US 2001/0042070).

Independent claim 28 includes the same recitations as detailed with respect to claim 1 above. The appellant therefore respectfully submits that all of the points raised above with respect to the claim 1 are relevant for claim 28 as well. Those points will not be repeated here, however, for the sake of brevity, but to say that claim 28 is deemed allowable as well for the same reasons.

E. Rejection under 35 U.S.C. 103(a) – Williams, Ernst, in view of Kajiwara

The Examiner rejected claim 30 under 35 U.S.C. §103(a) as being unpatentable over Williams in view of Ernst, as applied to claim 1 above, and further in view of Kajiwara (US 2002/0015386).

Appellant respectfully submits that claim 30 is dependent on claim 1, previously distinguished and hereby incorporated by reference, and is therefore deemed allowable as well in view of this dependency.

F. Rejection under 35 U.S.C. 103(a) – Williams, Ernst, in view of Callon

The Examiner rejected claims 31 and 32 under 35 U.S.C. §103(a) as being unpatentable over Williams in view of Ernst, as applied to claim 1 above, and further in view of Callon et al (US 5,854,899).

Appellant respectfully submits that claims 31 and 32 are dependent on claim 1, previously distinguished and hereby incorporated by reference, and are therefore deemed allowable as well in view of this dependency.

(v) Other rejections

None.

In conclusion, and for the above reasons, the appellants respectfully submit that the rejection of Claims 1-6, 10-12, 27, 29 and 33 under 35 U.S.C. §103(a) as being unpatentable over Williams et al (US 5883891, hereinafter "Williams") in view of Ernst ("Network Mobility Support in IPv6", a PhD thesis to the Dept. of Mathematics and Computer Science at the Universite Joseph Fourier, France, October 29, 2001, hereinafter "Ernst"), the rejection of claim 7 under 35 U.S.C. §103(a) as being unpatentable over Williams in view of Ernst, as applied to claim 5, and further in view of Inoue (US 6,587,882), the rejection of claims 8 and 9 under 35 U.S.C. §103(a) as being unpatentable over Williams in view of Ernst, as applied to claim 5, and further in view of Baba et al (US 6,799,204), the rejection of claim 28 under 35 U.S.C. §103(a) as being unpatentable over Williams in view of Ernst, and further in view of Jinzaki (US 2001/0042070), the rejection of claim 30 under 35 U.S.C. §103(a) as being unpatentable over Williams in view of Ernst, as applied to claim 1, and further in view of Kajiwara (US 2002/0015386), and the rejection of claims 31 and 32 under 35 U.S.C. §103(a) as being unpatentable over Williams in view of Ernst, as applied to claim 1, and further in view of Callon et al (US 5,854,899), are in error and should be reversed and the claims allowed.

8. CLAIMS APPENDIX

1. A method of transmitting a data packet on a communication path from a first communication node to a second communication node in a mobile network, where the second communication node is connected to the data network through at least one intermediary mobile router, the method comprising the steps of:

the second communication node determining a care-of route including a list of addresses of the at least one intermediary mobile router between said data network and said second communication node;

the second communication node sending a route message to the first communication node without any explicit request for said route message being received by the said second communication node from the first communication node, wherein said route message includes the care-of route;

the first communication node generating a preferred communication path in response to said care-of route received from said second communication node; and

the first communication node transmitting said at least one data packet from said first communication node to said second communication node via said preferred communication path.

2. The method of transmitting a data packet according to Claim 1, wherein said mobile network supports nested network mobility operation and said step of transmitting includes the step of:

routing said at least one data packet via a plurality of mobile routers identified by said intermediary addresses in said mobile network.

3. The method of transmitting a data packet according to Claim 1, wherein said mobile network operates in accordance with an IPv6 and/or IPv4 specification.

4. The method of transmitting a data packet according to Claim 1, wherein said first communication node is a correspondent node of the said second communication node and/or said second communication node is a mobile network node.

5. The method of transmitting a data packet according to Claim 1, the method further comprising the step of:

sending a care-of route advertising message, by a plurality of communication nodes in the mobile network, that includes route information related to communication nodes attached to said second communication node, so that a communication path to an intended recipient can be determined.

6. The method of transmitting a data packet according to Claim 1, wherein said list of the plurality of intermediary addresses includes addresses of one or more mobile routers above the second communication node and includes a care-of address of the second communication node itself, if the second communication node is a mobile node, in a route hierarchy for delivering said data packet to an intended recipient.

7. The method of transmitting a data packet according to Claim 5, the method further comprising the step of:

requesting transmission of one or more care-of route advertisement messages, containing route information of one or more IP addresses, from adjacent communication nodes when said second communication node moves to a new location within the mobile network.

8. The method of transmitting a data packet according to Claim 5, the method further comprising the steps of:

extracting intermediary route messages from said route information in said care-of route advertising message at a communication node; and

transmitting said intermediary route messages to communication nodes that the extracting communication node serves.

9. The method of transmitting a data packet according to Claim 8, the method further comprising the step of:

appending a route message of the communication unit to said list of intermediary routes in said care-of route advertising message at said communication node.

10. The method of transmitting a data packet according to Claim 5 further comprising the step of:

sending periodically said care-of route advertising message to all or a selected number of communication nodes in the mobile network.

11. The method of transmitting a data packet according to Claim 5, the method further comprising the step of:

sending a mobile network prefix advertisement message by a mobile router at a top of a routing hierarchy in the mobile network to advertise said mobile network prefix; and

determining by communication nodes in the same mobile network that they are located within the sending mobile router's mobile network.

12. The method of transmitting a data packet according to Claim 1, the method further comprising the step of:

sending an extended binding update message containing route information only to communication nodes outside of the sending communication node's mobile network.

13-26. (canceled).

27. A data network including a first communication node for transmitting a data packet on a communication path from the first communication node to a second communication node, where the second communication node is in a mobile network connected to the data network through at least one intermediary mobile router, the data network comprising:

the second communication node determines a care-of route including a list of addresses of the at least one intermediary mobile router between said data network and said second communication node, and sends a route message to the first communication node without any explicit request for said route message being received from the first communication node, wherein said route message includes the care-of route; and

the first communication node generates a preferred communication path in response to said care-of route received from said second communication node, and transmits said at least one data packet to said second communication node via said preferred communication path.

28. A method for building an extended binding cache for a data packet on a communication path from a first communication node to a second communication node in a mobile network, where the second communication node is connected to the data network through at least one intermediary mobile router, the method comprising the steps of:

determining, by the second communication node, a care-of route including a list of addresses of the at least one intermediary mobile router between said data network and said second communication node;

sending, by the second communication node, an extended binding update message to the first communication node without any explicit request for said update message being received by the said second communication node from the first communication node, wherein said update message includes the care-of route for messages to reach said second communication node;

receiving, from the second communication node, the extended binding update message indicating the intermediary addresses in the route for messages to reach said second communication node;

comparing said intermediary addresses of said extended binding update message with intermediary addresses, if any, of the first communication node's care-of route;

extracting at least one subsequent route of said second communication node, when said comparison fails to yield a match following previous route matches, thereby generating an extended binding cache entry indicating a preferred route to said second communication node; and

transmitting said data packet from said first communication node to said second communication node via said preferred route.

29. The method of transmitting a data packet according to Claim 1, wherein the sending step includes the second communication node sending the route message when it detects that a new communication is started with the first communication node.

30. The method of transmitting a data packet according to Claim 1, wherein the sending step includes the second communication node sending the route message when it decides to trigger route optimization for an ongoing communication with the first communication node.

31. The method of transmitting a data packet according to Claim 1, wherein the sending step includes the second communication node sending the route message when it detects that its care-of route has changed.

32. The method of transmitting a data packet according to Claim 31, wherein the care-of route has changed due to the IP mobility of one or more of its upper mobile routers connecting it to the data network.

33. The method of transmitting a data packet according to Claim 1, wherein the generating step generates the preferred communication path based on at least the care-of route received from the second communication node and a second care-of route relating to the first communication node that includes a list of mobile router addresses between the first communication node and the data network.

9. EVIDENCE APPENDIX

Not applicable

10. RELATED PROCEEDINGS APPENDIX

Not applicable

Respectfully submitted,

Janneteau et al.

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